

Please amend the claims as follows:

1. (currently amended) A database management system having the improvement comprising:
 - bitmap values, a bitmap value having a representation of a bitstring wherein set bits
- 5 specify a set of objects whose definitions are built into the database management system, and
~~bitmap operations provided by the database system, a bitmap operation having user-specified operands which are bitmap values and/or sets of objects which permit users of the database system to directly specify operations on the bitmap values.~~
- 1 2. (currently amended) The database management system set forth in claim 1 wherein the
2 ~~user-accessible bitmap~~ operations comprise at least:
 - 3 a set-to-bitmap operation wherein a bitmap value is derived from a ~~given~~ set of the
4 objects specified in an operand.
- 1 3. (currently amended) The database management system set forth in claim 2 wherein:
 - 2 the derived bitmap value is a new bitmap value that specifies the objects in the ~~given~~
3 specified set.
- 1 4. (currently amended) The database management system set forth in claim 2 wherein:
 - 2 the derived bitmap value is a preexisting bitmap value which now further specifies the
3 objects in the given-specified set.
- 1 5. (currently amended) The database management system set forth in claim 2 wherein:
 - 2 the derived bitmap value is a preexisting bitmap value which now no longer
3 specifies any objects in the given-specified set.
- 1 6. (currently amended) The database management system set forth in claim 1 wherein the
2 ~~bitmap user-aeeessible~~ operations comprise at least:
 - 3 a bitmap-to-set operation wherein the set of ~~the~~ objects specified in a ~~given~~-bitmap
4 value specified in an operand is derived from the given-specified bitmap value.

1 7. (currently amended) The database management system set forth in claim 1 wherein the
2 ~~user-accessible-bitmap~~ operations comprise at least:

3 a bitmap-to-count operation wherein the number of the objects in the set specified in a
4 ~~given-bitmap value specified in an operand~~ is derived from the ~~given-specified~~ bitmap value.

1 8. (currently amended) The database management system set forth in claim 1 wherein the
2 ~~user-accessible-bitmap~~ operations comprise at least:

3 an existence operation wherein a value representing the logical value TRUE is returned
4 when ~~an-given-object-specified-in-an-operand~~ belongs to the set of the objects represented by a
5 ~~given-bitmap value specified in another operand~~.

1 9. (currently amended) The database management system set forth in claim 1 wherein the
2 ~~user-accessible-bitmap~~ operations comprise at least:

3 a logical operation on a first bitstring ~~represented by from~~ a first bitmap value
4 ~~specified in an operand~~ and a second bitstring ~~represented by from~~ a second bitmap value
5 ~~specified in another operand~~.

1 10. (currently amended) The database management system set forth in claim 1 wherein the
2 ~~user-accessible-bitmap~~ operations comprise at least:

3 a comparison operation on a first bitmap value ~~specified in an operand~~ and a second
4 bitmap value ~~specified in another operand~~ wherein a value representing the logical value
5 TRUE is returned when the first bitmap value and the second bitmap value specify the same set
6 of ~~the~~ objects.

1 11. (currently amended) The database management system set forth in claim 1 wherein:

2 the bitmap values ~~include-settable~~include settable bitmap values; and

3 the ~~user-accessible-bitmap~~ operations comprise at least an assignment operation which
4 sets a target settable bitmap value ~~specified in an operand~~ from a source bitmap value ~~specified~~
5 in another operand.

1 12. (original) The database management system set forth in claim 1 wherein:

2 the bitmap values include bitmap values that are persistent in the database management
3 system.

1 **13.** (currently amended) The database management system set forth in claim 12 wherein:
2 the persistent bitmap values include bitmap values in user-specified fields of tables of
3 the database management system.

1 **14.** (currently amended) The database management system set forth in claim 1 wherein:
2 the bitstring-bitstring in the bitmap value is compressed.

1 **15.** (original) The database management system set forth in claim 1 wherein:
2 the objects are identifiers for other objects that exist in the database management
3 system.

1 **16.** (original) The database management system set forth in claim 15 wherein:
2 the identifiers for the other objects are row identifiers of rows in the database
3 management system.

1 **17.** (original) The database management system set forth in claim 16 wherein:
2 the row identifiers are row identifiers returned by a user-defined query executed in the
3 database management system.

1 **18.** (original) The database management system set forth in claim 17 wherein:
2 the query returns a row identifier when a field in the row has an attribute specified in
3 the query,
4 whereby the bitmap value represents the set of fields having the specified attribute.

1 **19.** (original) The database management system set forth in claim 1 wherein:
2 the objects are identifiers for other objects that exist outside the database management
3 system.

1 **20.** (original) The database management system set forth in claim 19 wherein:
2 the identifiers for objects that exist outside the database management system are
3 electronic product codes for product items.

1 **21.** (original) A data storage device, the data storage device being characterized in that:
2 the data storage device contains code which, when executed in a computer system,
3 implements the database management system set forth in claim 1.

1 **22.** (currently amended) A bitmap value employed in a database management system, the
2 bitmap value representing a first subset of a second subset of objects that are defined in the
3 database management system, set of first objects, the first objects being external to the
4 database management system and members of the first set being mapped onto a members of a
5 second set of second objects that is defined in the database management system, and
6 the bitmap value comprising:

7 a mapping specifier that maps a string of bits to a subset of the second set the second
8 subset; and

9 a representation of the string of bits wherein a bit is set in the represented string of bits
10 when the member of the second set subset that is mapped to the bit belongs to the first subset
11 and the database management system providing at least a first operation which permits users of
12 the database system to specify the mapping of the string of bits to the second subset and a
13 second operation which permits users to directly specify setting bits of the string of bits that
14 correspond to the first subset has a member of the first set mapped thereto.

1 **23.** (original) The bitmap value set forth in claim 22 wherein:
2 the second objects are ordered.

1 **24.** (currently amended) The bitmap value set forth in claim 23 wherein:
2 the order of the members of the second ordered set objects corresponds to values of the
3 members thereof objects;
4 the mapping specifier specifies the mapping by specifying one or more ranges of the
5 values of the members of the second ordered set objects to which the string of bits is mapped;
6 and
7 the representation of the string of bits represents strings of bits corresponding to the
8 ranges.
9

1 **25.** (original) The bitmap value set forth in claim 24 wherein:

2 the mapping specifier specifies the range of the values by specifying a start value and
3 an end value.

1 **26.** (original) The bitmap value set forth in claim 24 wherein:
2 the values include a prefix which determines a range of the values; and
3 the mapping specifier specifies the range of the values by specifying the prefix for the
4 range.

1 **27.** (original) The bitmap value set forth in claim 26 wherein:
2 the mapping specifier further specifies the range of the values by using a start value and
3 an end value to specify one or more subranges of the range specified by the prefix.

1 **28.** (canceled)

1 **29.** (currently amended) The bitmap value set forth in claim 22 wherein:
2 the ~~identifiers for objects in the first set~~ are electronic product codes ~~for the objects~~.

1 **30.** (original) The bitmap value set forth in claim 22 wherein:
2 there is a plurality of the bitmap values in the database management system; and
3 certain of the bitmap values are persistent in the database management system.

1 **31.** (currently amended) The bitmap values set forth in claim 30 wherein:
2 the persistent bitmap values include bitmap values in user-specified fields of tables of
3 the database management system.

1 **32.** (original) The bitmap value set forth in claim 22 wherein:
2 the representation of the bitstring is a compressed representation thereof.

1 **33.** (currently amended) The bitmap value set forth in claim 22 wherein:
2 there is a plurality of the bitmap values in the database management system; and
3 the database management system provides further a plurality of user-accessible
4 operations on the bitmap values.

1 **34.** (currently amended) The bitmap value set forth in claim 33 wherein:

2 certain of the user-accessible operations alter the range specifier and the representation
3 of ~~the bitstring~~the bitstring as required to map the represented string of bits to a second subset
4 ~~of the second~~ set that is required for the operation.

1 **35.** (original) A data storage device, the data storage device being characterized in that:

2 the data storage device contains code which, when executed in a computer system,
3 implements the bitmap value set forth in claim 22.

1 **36.** (currently amended) A method employed in a database system of making a bitmap value
2 that represents a first subset of a second subset of objects ~~external to the database system~~that
3 are defined in the database management system,

4 the method comprising the steps performed in the database system of:

5 performing a first operation provided by the database system to users of the system, the
6 first operation mapping a bitstring that is represented in the bitmap value onto the second
7 subset; and the objects onto a second ordered set of identifiers defined in the database
8 management system;

9 mapping a bitstring that is represented in the bitmap value onto a subset of the second
10 set that includes the identifiers onto which the objects have been mapped; and

11 performing a second such operation, the second operation setting the bits in the
12 bitstring that correspond to the identifiers onto which the objects have been mappedfirst subset.

1 **37.** (canceled)

1 **38.** (currently amended) The method set forth in claim 36 wherein:

2 ~~in the second set, the identifiers~~the objects are electronic product codes.

1 **39.** (currently amended) The method set forth in claim 36 wherein the objects are ordered and
2 the step of mapping a bitstringperforming the first operation comprises the steps of:

3 making a range specifier that specifies a range of the ordered set of identifiers that
4 includes the identifiers into which the objects have been mapped; and
5 mapping the bits in the bitstring to the specified range.

1 **40.** (original) The method set forth in claim 39 wherein the step of making a range specifier
2 includes the step of:

3 making a start value and an end value which together specify the range.

1 **41.** (original) The method set forth in claim 39 wherein the step of making a range specifier
2 includes the step of

3 making a prefix value which specifies the range.

1 **42.** (original) The method set forth in claim 36 further comprising the step of:

2 compressing the bitstring.

1 **43.** (original) A data storage device, the data storage device being characterized in that:

2 the data storage device contains code which, when executed in a computer system,
3 implements the method set forth in claim 36.

1 **44.** (currently amended) A bitmap value employed in a database management system to
2 represent a first subset of the row identifiers defined in the database management system,

3 the bitmap value comprising:

4 a mapping specifier that maps a string of bits to a second subset of the set of row
5 identifiers, the second subset including the first subset; and

6 a representation of the string of bits wherein a bit is set in the represented string of bits
7 when the member of the second subset that is mapped to the bit corresponds to a member of
8 the first subset, the database management system providing at least a first operation which
9 permits users of the database system to directly specify the mapping of the string of bits to the
10 second subset and a second operation that permits users of the database system to directly
11 specify setting bits of the string of bits that correspond to the first subset; and

12 the first subset is returned by a user-defined query executed by the database
13 management system.

1 **45.** (currently amended) The bitmap value set forth in claim 44 wherein:

2 ~~the database management system~~the first operation dynamically alters the mapping
3 specifier ~~and the representation of such that~~ the string of bits ~~as required to map the~~

4 ~~representation of the string of bits is mapped to a second subset of the row identifiers that~~
5 includes the first subset of the row identifiers.

1 **46.** (currently amended) The bitmap value set forth in claim 44 wherein:
2 ~~the query returns a row identifier when a field in the row identified by the row identifier~~
3 ~~has an attribute specified in the query~~~~the first subset is returned by a query which returns a row~~
4 ~~identifier when a field identified by the row identifier has an attribute specified in the query,~~
5 whereby the bitmap value represents the set of fields whose values have the specified attribute.

1 **47.** (original) A data storage device, the data storage device being characterized in that:
2 the data storage device contains code which, when executed in a computer system,
3 implements the method set forth in claim 44.

1 **48. (Canceled)**

1 **49. (Canceled)**

1 **50. (Canceled)**

1 **51. (Canceled)**

1 **52. (Canceled)**

1 **53. (Canceled)**

1 **54. (Canceled)**

1 **55. (Canceled)**

1 **56. (Canceled)**

57. (Canceled)